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Proceedings of the regional peer review meeting of reference points for American plaice (*Hippoglossoides platessoides*) from NAFO Division 4T

February 21, 2012

Moncton, New Brunswick

Chairperson: Gérald Chaput

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Foreword

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings may include research recommendations, uncertainties, and the rationale for decisions made during the meeting. Proceedings may also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report individually may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the timeframe of the meeting. In the rare case when there are formal dissenting views, these are also archived as Annexes to the Proceedings.

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MPO. 2014. Compte rendu de l'examen par des pairs régional sur les points de référence pour le stock de plie canadienne (Hippoglossoides platessoides) du sud du golfe du Saint-Laurent (division 4T de l'OPANO), le 21 février, 2012. Secr. can. de consult. sci. du MPO, Compte rendu 2013/047.

SUMMARY

A regional advisory process meeting was held February 21, 2012 in Moncton (NB) to conduct a science peer review of reference points for the American plaice (*Hippoglossoides platessoides*) stock of NAFO Division 4T, from the southern Gulf of St. Lawrence. The science review was conducted in response to a request from DFO Fisheries and Aquaculture Management (FAM) for advice regarding the development of reference points that are consistent with the Precautionary Approach. Participants at the science review included science staff from the DFO Gulf, Maritimes and Newfoundland regions, personnel from DFO FAM, and from the fishing industry. The most recent population model and proposals for biomass limit reference points were reviewed. Only a biomass limit reference point was developed and accepted at the meeting. The products of the meeting include a science advisory report describing the limit reference point and a supporting research document.

SOMMAIRE

Une réunion dans le cadre du processus de consultation régionale a eu lieu à Moncton, au Nouveau-Brunswick, le 21 février 2012, pour entreprendre un examen scientifique par les pairs des points de référence du stock de la plie canadienne (*Hippoglossoides platessoides*) de la division 4T de l'OPANO, dans le sud du golfe du Saint-Laurent. L'examen scientifique a été effectué en réponse aux demandes de consultation formulées par Gestion des pêches et de l'aquaculture du MPO concernant l'élaboration de points de référence conformes à l'approche de précaution. Les participants à l'examen scientifique comprenaient des membres du personnel scientifique des régions du Golfe, des Maritimes et de Terre-Neuve-et-Labrador, des employés de la Gestion des pêches et de l'aquaculture du MPO, et des membres de l'industrie de la pêche. On examine le dernier modèle de population et les dernières propositions concernant les points de référence limite de la biomasse. On n'élabore et n'accepte qu'un seul point de référence limite de la biomasse lors de la réunion. On produit notamment durant cette réunion un avis scientifique dans lequel on décrit le point de référence limite et les documents de recherche à l'appui.

1. INTRODUCTION

The Department of Fisheries and Oceans (DFO) conducted a regional peer review meeting on February 21, 2012 in support of a request from DFO Fisheries and Aquaculture Management for the development of reference points that could be used in the application of the precautionary approach framework for American plaice (*Hippoglossoides platessoides*) of the southern Gulf of St. Lawrence, NAFO Div. 4T. The terms of reference for the peer review meeting are provided in Appendix 1.

The meeting began at 9:00 AM. The chair opened the meeting by welcoming the participants and reviewing the meeting room arrangements including the availability of simultaneous translation services for the meeting participants. The chair explained the process of requesting science advice, preparation of the meeting materials, the science review, and the expected outcomes. A science advisory report, a proceedings document and a research document are the expected products of the meeting.

The chair reviewed the rules of exchange for the meeting, reminding participants that the meeting was a science review and not a consultation. As well, everyone at the meeting had equal standing as participants as there was no observer status at the meeting. Table microphones were provided to ensure good communication during the meeting. Finally, the objective was to achieve consensus on the appropriateness of the analyses and to come to conclusion on reference points for the American plaice stock. For the purposes of the science review, consensus was taken as an absence of opposition.

The chair then invited the participants to introduce themselves; the list of participants is provided in Appendix 2.

The draft agenda was reviewed and accepted (Appendix 3).

There was one working paper to be reviewed. It was distributed by email to meeting participants on February 20, 2012. Two other information documents were provided to participants: 1) Sentinel survey report for 2011, and 2) Research survey report for 2011.

Rapporteur duties were assigned to Sophie LeBlanc (DFO Science Gulf Region).

The working paper was presented by Rod Morin, DFO Science Gulf Region

2. POPULATION MODEL FOR AMERICAN PLAICE OF NAFO DIV. 4T

An ADAPT population model for the American plaice stock had been developed for the recent Recovery Potential Assessment of American plaice of the Maritimes Designatable Unit. A revised model was since developed which was programmed in AD Model Builder. This allowed for more flexibility in how natural mortality (M) is incorporated. In the case of the revised model, M is modelled as a time-varying random walk process for two blocks of ages (4-9, 10+ years) rather than in blocks of years as had been done previously. The AD Model Builder formulation provides bootstrap estimates of recent year values which can then be used in projections.

Indices of abundance for the model include the research vessel survey and the sentinel survey age-disaggregated indices. The sentinel survey index begins in. Prior to 2003, the plaice indices from the sentinel survey are not considered representative of abundance due to differences in survey coverage and design.

Other changes from the previous model used for the RPA include adding the catch and abundance indices for 2010 and 2011. The addition of the recent two years changed the results of the population model, in its ADAPT formulation as well as in the revised AD Model Builder form.

An error in the weight-at-age matrix was noted during a review of the model outputs. The correct weight-at-age matrix was provided and the model was rerun over lunch and revised SSB and recruitment values were provided for review.

The major points of discussions regarding the model are described below.

2.1 Natural mortality (M)

Natural mortality is estimated to have been very high in the past. Despite attempts to incorporate the effects of discarding in the early portion of the time series, M remains high. M is also high presently despite reduced fishing effort and no discarding. The high natural mortality values estimated from the model are seen in the relative indices at age from the research vessel survey.

Natural mortality on adult plaice is estimated to be in the range of 0.45-0.6. For the Recovery Potential Assessment, it was concluded that even without fishing, the stock would not rebuild.

High natural mortality is a problem for many groundfish species in the southern Gulf and it has been the focus of directed research by scientists in the region. For many of these species, until natural mortality declines, stocks are not going to recover. Predation by grey seals is a likely hypothesis for the high natural mortality This was underlined in a recent science review of grey seal predation on groundfish.

2.2 Catchability coefficients

The catchability of the sentinel survey gear is lower than the RV survey. Differences between the sentinel and the RV survey include different area coverage, different codend mesh, and slower towing speed.

There are some cohort effects in the residuals and the patterns are common to both the RV and sentinel surveys. The cause of the patterns is unknown.

3. REFERENCE POINTS

A series of possible reference points and corresponding analyses were described in the working paper and discussed. The input data are Spawning stock biomass (SSB) in weight and estimated recruitment at age four years in number. SSB values and recruitment from the corrected model runs were considered in the stock and recruitment analyses.

3.1 Biomass limit reference point

There is a discussion on what limit reference points (LRP) to consider. It is agreed that the parametric models (Beverton-Holt, Ricker) should be used and estimates using different approaches (Bayesian models, deterministic models) be examined. Whichever model is chosen, it is important to state the uncertainties and to include these in the advisory report.

The LRP chosen was the SSB that resulted in 50% of maximum recruitment. Ricker and Beverton-Holt functions were examined. The outputs from each were retained and as they were close and there was no clear difference in model fits, the average of the median value from each was used. The median values were developed from the posterior distributions based on Bayesian models programmed in OpenBUGS.

The LRP was defined as an SSB of 60,000 to 68,000 t. The stock has been below the LRP in 15 of the past 16 years.

3.2 Other reference points

Maximum sustainable yield calculations were attempted during the meeting based on the stock and recruitment relationship, and parameters for M, fishing selectivity, and weights at age. No realistic solutions for MSY, and F at MSY were found possibly because of the high natural mortality values currently acting on the stock. No removal rate reference point was agreed to at this time.

Options for an Upper Stock Reference (USR) point were not provided. Proxies for USR are based on MSY considerations. As no MSY calculations could be done at this time, no USR candidate points were proposed.

4. ADVISORY REPORT AND MEETING PRODUCTS

A draft of the advisory report was completed after the meeting. The draft report was circulated to meeting participants on March 19, 2012 and finalized on April 20, 2012.

The working paper should be upgraded into a research document and should include the corrections to the data and the resulting changes to the population model resulting from the review.

APPENDIX 1. TERMS OF REFERENCE FOR THE REVIEW OF REFERENCE POINTS FOR AMERICAN PLAICE (HIPPOGLOSSOIDES PLATESSOIDES) FROM NAFO DIVISION 4T.

Context

In support of a request for science advice from DFO Fisheries and Aquaculture Management, DFO Gulf Science Branch will review and develop reference points for the American plaice (*Hippoglossoides platessoides*) stock of the southern Gulf of St. Lawrence (NAFO Division 4T) that are consistent with the Precautionary Approach Policy (DFO 2009). Limit reference points for stock abundance and limit removal rate reference points will be defined. A proposal for an upper stock reference point based on the guidance in DFO (2009) will be provided. The most recent assessment for 4T American plaice reviewed during the Recovery Potential Assessment of March 2011 will be used as the basis for the review (DFO 2011).

Objectives

- Review and propose reference points for the American plaice stock of NAFO Division 4T.
- Description of the population model and estimates of spawning stock biomass and recruitment.
- Options for stock abundance limit reference point
- Options for removal rate limit reference point
- Options for upper stock reference point
- Identification of uncertainties and knowledge gaps

Expected publications

- CSAS Science Advisory Report
- CSAS Proceedings report summarizing the discussions of the science review.
- CSAS Research Document(s).

Participation

- DFO Science Branch
- Other DFO Sectors
- Provinces
- External experts (to DFO)
- Fishing industry
- Aboriginal peoples

References

DFO. 2009. A fishery decision-making framework incorporating the Precautionary Approach.

DFO. 2011. Recovery Potential Assessment of the Maritime Designatable Unit of American Plaice (*Hippoglossoides platessoides*). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2011/043.

APPENDIX 2. LIST OF PARTICIPANTS.

Name	Affiliation
Anderson, Paul	PEI Dependent Groundfish Association
Aubry, Eliane	DFO Science Gulf / MPO Sciences Golfe
Chaput, Gérald	DFO Science Gulf/ MPO Sciences Golfe
Cotton, Reginald	Association des Capitaines-propriétaires de la Gaspésie
Fowler, Mark	DFO Science Maritimes
Healey, Brian	DFO Science Newfoundland and Labrador
Hennessey, Frank	PEI Mobile Groundfish Fishermen's Association
LeBlanc, Sophie	DFO Science Gulf/ MPO Sciences Golfe
Lemelin, Dario	MPO GEP Québec
Morin, Rod	DFO Science Gulf / MPO Sciences Golfe
Savoie, Luc	DFO Science Gulf / MPO Sciences Golfe
Surette, Tobie	DFO Science Gulf / MPO Sciences Golfe
Swain, Doug	DFO Science Gulf / MPO Sciences Golfe
Wade, Elmer	DFO Science Gulf / MPO Sciences Golfe
White, Jeff	PEIFA

APPENDIX 3. MEETING AGENDA.

Time / heure	Tuesday February 21
8 30 – 9 00	Meeting room open
9 00 – 9 15	Introduction, review of agenda
9 15 – 10 30	Description of the population model and estimates of spawning stock biomass and recruitment.
10 30 – 10 45	Break
10 45 – 12 15	Options for stock abundance limit reference point Options for removal rate limit reference point Options for upper stock reference point Identification of uncertainties and knowledge gaps
12 15 – 13 15	Lunch
13 15 – 17 00	Follow-up from the morning (if required) Review of draft advisory report
15 00 – 15 15	Break